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ABSTRACT

This chapter of "Principles of School Business Management" reviews the extensive range of activities associated with planning for and constructing school facilities. These activities include (1) organizing the staff and organizing the task; (2) conducting long-range planning (involving the gathering of data, the development of a planning document, and the establishment of an approval process); (3) conducting fiscal planning (involving the selection of an appropriate financing method and the planning of a capital improvement program and budget); (4) planning, selecting, and acquiring the site; (5) developing educational specifications for use of the facility; (6) selecting architects to develop schematic and final designs, prepare construction contracts, monitor bidding and negotiations, and supervise the construction; (7) planning for occupancy of the new facility by the staff and by the public; (8) evaluating the planning and construction process and the final product; and (9) developing maintenance and operating procedures. Particular attention is focused on the elements and processes of planning; the working relationships that must be formed among the educators, architects, and builders; the criteria to be considered when selecting sites, designs, and key personnel; and cost-effectiveness and energy conservation in facility operations. Forty-six notes cite relevant sources. (PGD)

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Facility Planning and Management

Glen I. Earthman

Planning a school building is a series of interrelated activities, conducted by many professionally and technically trained personnel and involving many community persons. Some early activities can be completed independently of others and out of sequence of the succeeding process; but, for the most part, each activity depends on the preceding activity for success of the planning effort. However, each activity is discrete; it has a beginning and an end. Each activity fits into a chain of events that produces a product, in this case, a school building.

Planning activities associated with building are some of the most technical and demanding done by the school district. With the normally large expenditure of funds for planning and building, they constitute the most expensive event or planning activity done by the organization. It is, therefore, important that the planning activities in the area of capital resource planning be done expeditiously and exactingly. Poor school facility planning is costly and almost always remains for the life of the building. Consequently, no effort should be spared in augmenting planning for capital projects.

More than planning activities produce a school facility; the general phrase "school facility planning" encompasses all activities that deal with programs at one end, and actual construction and evaluation of the facility on the other. All these activities are supervised and directed by school personnel trained in educational administration. The school district (and its employees) must see that all these activities are completed in accordance with school policy and state laws.

The kinds of activities the school district is normally responsible for either completing or having completed in planning for a school facility are:

- *Planning*
  Organizing the Staff
  Organizing the Task
- *Long-Range Planning*
  Gathering the Data
  Developing a Planning Document
  Approval Process
- *Fiscal Planning*
  Determining the Method of Financing Schools
  Planning the Capital Improvement Program and Budget
- *Site Planning and Selection*
  Selection of Site
  Acquisition of Site

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- *Architectural Services*
  Criteria Development
  Selection Procedure
- *Planning the Facility*
  Program Development
  Preparation of Educational Specifications
- *Design Process*
  Design Development
  Design Review and Approvals
- *Bid and Construction*
  Bidding the Project
  Construction Supervision
- *Planning for Occupancy*
  Orientation of Staff
  Community Activities
- *Post-Occupancy Evaluation*
  Process Evaluation
  Product Evaluation

Usually, one office is charged with heading the planning process for school facilities. In a large school district, that office may be headed by an Assistant Superintendent for School Planning. Under this umbrella office, a number of offices may be headed by a director or supervisor, each charged with a responsibility related to the planning process:

- Demographic Planning
- Capital Program Planning
- Site Selection and Acquisition
- Facility Planning and Programming
- Architectural Review
- Construction

Each of these offices is headed by persons trained in that area of professional or technical expertise. The site selection and acquisition office might be directed by someone who has a law degree with specialization in real estate. Likewise, a person with an architectural registration might direct the architectural review office. All offices work together to complete each project contained in the capital improvement program (CIP) and budget, and each office completes its own activities.

Large schools need large organizational staffs; they must provide new or different housing for the student population. In small school systems, where the facility need is not as great, the staff is smaller. Someone, however, in every school district has responsibility for facility management and planning. In smaller school systems, the office usually is responsible for facility planning and maintenance and operations. When a new facility is needed or existing facilities need renovation, the office brings outside expertise into the district by contracting with various agencies or companies. Such assistance can comprise educational and financial consultants, architects and engineers. The general rule: the smaller the organization, the more outside expertise the school districts need to complete a facility planning project.

Regardless of the size of the staff of the school district, the activities required to plan and construct a school facility must be carried on by school district personnel or outside assistance.

Each project for planning a new school or a major renovation (or improvement to an existing facility) should be directed and guided by one person, augmented by appropriate school district and outside personnel. Several titles exist that such a person can be given and are used by school systems, such as supervisor of planning, facility planner, educational planner, project manager or planning director. Characteristics of such a position might include experience as a teacher and principal, planning knowledge and experience, work with governmental agencies outside of the school district, some knowledge of the design work of architects or of construction and ability to work with large and diverse groups. They may be hard to find in one individual, but such qualifications are needed in the course of planning for a school facility. At minimum, the person chosen should know the school district and its planning; the person can then gain experience by doing the planning. Often, the school district can obtain help from educational consultants to guide the individual through the process. But, it is of the utmost importance that one person be charged with the responsibility of carrying the project through to completion.

The task of planning, designing and constructing a building is an arduous and time-consuming one. Therefore, it is necessary to plan a facility long ahead of the time when the need, in terms of pupils requiring to be housed, becomes a fact. Unfortunately, in the decades after World War II many school systems could not even get ahead of the need and the idea was simply to catch up with the population. Those situations need not ever happen again because the planning expertise available to the educational establishment of the country should be able to counter the social and demographic conditions that caused such a situation.

But the key to that scenario is that the planning expertise be utilized properly. Many instances are reported where the school district did not adequately plan ahead for facilities. Undoubtedly, those instances illustrate the lack of planning on the part of educators and boards of education or the proper use of planning resources. School systems still need to be reminded to improve their planning processes and utilize the resources available to them.

Long-Range Planning

Only fourteen states require some form of long-range planning on the part of the local school district.[1] As discouraging as this may be, however, it probably does not accurately represent the level of such planning that is actually practiced on the local level. Nevertheless, the need for and importance of long-range planning cannot be over-emphasized because there still is not enough long-range planning done by school systems across the country. The limited resources available to public schools and the increasing demand for services from constituents make it mandatory that every school district have in place a long-term plan to guide its development. Additionally, to secure a high level of cooperation and coordination among all of the staff in working toward the common goals of the school district, the board of education needs this type of document to serve as a guide.

Depending on the state and locality and to a certain extent the complexity of organization, long-range plans can be very simple or extremely complex and comprehensive documents. For the most part, however, all long-range plans cover certain topics in an effort to give guidance to the way an organization responds to community demands and how the available resources should be used to meet those demands. The basic elements of a long-range plan addresses:

- What is the purpose of the organization?
- How is this purpose discharged?
- Where is the organization located?
- Who will carry out the purpose?
- Where will this activity be financed?

To answer these questions, considerable data need to be gathered from various offices and individuals of the school district as well as from other governmental agencies. The method of gathering the data becomes the method of planning; it can range in simplicity or complexity as the local situation demands. Obviously, with large urban organizations, the method of planning will be much more complex than in smaller ones. Regardless of the complexities of the planning method, the output or product will be the same, a document which will identify the organizational goals and list ways to achieve those goals and establish resources and methods of meeting them. But one of the first questions that has to be answered in determining the method of planning is who will actually be involved in the planning process?

The days of planning in a vacuum within the confines of the office of the central administration are long past, and a more participatory type of planning is usually in evidence. But the extent of involvement by various groups and individuals needs to be determined beforehand. Will teachers and other non-administrative types of employees be involved and to what extent? If so, which groups and individuals? Only the local school district can answer these questions, and the board of education is the body that makes the determination of who is involved.

Planning Methods

There are many ways of planning—of actually doing the work necessary to develop a plan of action. One model of planning, a seven-step process, is offered by Banghart and Trull:[7]

1) Define the educational problem
2) Analyze the planning problem areas
3) Conceptualize and design plans
4) Evaluate the plans
5) Specify the plan
6) Implement the plan
7) Plan feedback

The Council of Educational Facility Planners, International (CEFPI) lists a similar seven-step methodology for working with community members in the planning process. The emphasis in this planning model is an involvement of commu-

nity members in a decision-making process. This methodology lists the following steps:

1) *Get Organized/Define Problems and Goals.* In this step the organization/group/individuals must define the purpose or problem, what is to be accomplished, time lines, responsibilities and how this will be done.
2) *Gather Information.* The information needed to answer the above question is identified and collected. Both hard and soft data are gathered. The organization/group/individuals must locate the source and compile the data in appropriate form for use in the subsequent steps.
3) *Develop Priorities.* From the work in step two, there will be a list of needs. In this step criteria are established for prioritizing the needs. The needs with the highest priority are the ones that the planning process will help to achieve.
4) *State Program and Facility Needs.* In this step the organization/group/individuals assess which priority needs can be met by existing resources and what changes are needed to do so and determine program and facility needs for priorities which cannot be met by existing resources.
5) *Explore Options.* The options identified above need to be explored in terms of the community. They need to be evaluated in several different ways so that one preferred option is selected.
6) *Refine Preferred Option.* Once community agreement has been achieved on a preferred option, it is necessary to work out the details. The kinds of details that will need to be addressed will depend on the nature of the alternative which best meets the needs of the community.
7) *Follow Through.* This step or phase is the execution of the plan of action. The form of activity under this step can take the form of hiring new staff, offering new programs, initiating capital projects, signing agreements or getting out publicity. The implementation of the plan begins here.[3]

The organization/group/individuals involved also address other concerns after they have completed the final step. These concerns deal with the continuing role in the planning process, evaluation plan for periodic review and communication about the preferred option and its implementation.

The two lists are similar in what is done to arrive at the plan of action. The CEFPI model is based on wide community and organizational involvement.[4] Because of the nature of the school district it seems important to involve both the clients and the operators of the organization. Each school district, however, must decide the methodology to be used in developing a plan so that local conditions, available expertise, indigenous processes and state requirements are observed.

Long-Range Plan Elements. The specific topics to be covered in any particular long-range plan may be governed by law, but they nevertheless address the questions that were raised in the first part of the chapter.

1) *Description of the community.* The particular community and its inhabitants are described in detail including the make-up of the various groups that are found in the area and other demographic statistics. Community resources in terms of agencies, organizations, physical features and even individuals may be described here.

2) *Description of the Educational Program.* The goals and purposes of the organization should be delineated and then refined into objectives. Some organizations term this the mission statement. Following this, a description of the educational program that stems from the goals or mission statement and is currently carried on should be specified in detail. The proposed changes to the program should also be stated. Scope and sequence also needs to be enunciated, and the human resources needed to staff the educational program should be identified.

3) *Identification and Projection of Clientele to be Served.* This section of the report looks at the number and kinds of students to be educated now and in the future. The pupil population of the schools should be projected for the next five years so that educators can anticipate the kinds and amounts of materials, textbooks, staff, furniture and facilities that will be needed. The projections of clientele should not be limited only to the age group traditionally served by the school, but should also project numbers of pre-schoolers and adults that will be served by programs sponsored by the public schools.

4) *Appraisal of Existing Facilities.* The existing facilities must be appraised to determine their adequacy in terms of the kinds of educational programs to be implemented and the number of students to be housed. The results of this evaluation, on a school-building-by-school-building basis, are listed in this section of the document. Buildings to be abandoned, renovated and improved and where applicable the number and kinds of new facilities needed should be stated. From the appraisal of the existing facilities, items for the maintenance section of the Capital Improvement Program (CIP) are identified. These items then go directly into the proposed CIP.

5) *Physical Changes and New Construction.* In this section of the document all of the needed changes, improvements and new construction need to be identified quite specifically. This section differs from the previous section in that physical changes, maintenance items and new construction are identified and listed out in prioritized fashion. The previous section contains the entire evaluation of each facility that includes evaluative statements plus physical changes necessary to bring the particular facility up to par to house the proposed educational program.

6) *Financial Plan.* The financial resources necessary to fund the type of program previously described need to be detailed. The plan should identify additional staff, increases in instructional materials, funds and equipment to implement the new educational program. The capital needs for the new program are also specified in terms of costs. Both the operation and capital costs need to be projected over the life of the proposed long-range plan.

After the long-range plan is developed, it is submitted to the board of education for their approval. When it is approved, the document serves as the guide for all planning activities in the school district for the life of the plan. The life of the plan, however, may be only one year; the staff and board of education should review the long-range plan each year to determine what changes and revisions need to be

made. Often the changes are such that a new long-range plan is then developed. Usually revisions are made annually; at the end of five years a new long-range plan is made.

The data contained in the long-range plan regarding facilities become data for the CIP and the Capital Budget. Changes in the long-range plan would produce subsequent changes in the CIP. The same sort of relationship exists between other segments of the long-range plan and various offices of the school district as it does for the school facilities department. For example, the type of staff needed to implement the educational program becomes data for the human resource plan of the school district. With each subsequent change in the long-range plan, all segments of the school district will need to change their plans.

Fiscal Planning

Having the necessary funds at the proper time to construct a proposed capital project is crucial to the success of the planning process. Few, if any, school systems have sufficient resources to provide for all of the physical needs of the community at one time; consequently, fiscal planning must take the form of obtaining funds for designated projects at a given time. Depending on the location of the school district and even the type of project under consideration, funds for capital improvement projects can be obtained from three different levels of government: federal, state and local.

Federal Funds. Funding for local capital construction projects is now virtually nil. Previously, funds were available under impact aid legislation and through selected vocational education acts; however, the current position of the federal government is that local school systems should provide funds for all school buildings.

State Funds. Despite the fact that education is a state responsibility, most states rely on local school systems to provide for the housing of students. But there are some states that do provide limited assistance. The degree of assistance varies from absolutely no financial assistance to full state funding of selected projects such as in the Maryland and Florida state assistance programs.[1] But even here the two states do not provide funds for all capital projects that are needed on the local level. Hawaii could also be considered a full state funded program inasmuch as there is only one school district in that state.

State assistance can be in the form of grants or loans. Where states do provide grants of funds for capital projects, there is usually a formula of matching local funds. The exception is the full state funding programs mentioned previously. The intent of a state loan program is to enable the local school district to obtain low-interest funds to accomplish capital projects. Such loans are paid back over a period of time varying from ten to forty years.

Local Funds. The vast majority of states rely heavily on local funds to finance construction of school buildings. School systems have access to several methods of obtaining funds, but not all listed here are available in every state. By far the most prevalent method of obtaining local funds is through bonding, although in recent

years bond election failures have caused school systems to look at other methods of funding buildings.

Leasing. School systems can enter into two types of leasing arrangements, long-term and short-term. Short-term leasing is usually used to meet certain needs such as emergency housing when the regular school facility is not available because of disaster, or if the new school facility is not ready. Under such circumstances school districts often contract with churches and synagogues to use the educational facilities during the week on a one- or two-year basis.

Long-term leasing is tantamount to buying the facility by paying a rental fee over the life of the facility. Such leasing is often used for relocatable or portable buildings. In some states, a building authority or similar agency can construct a school building under the specifications of the local school district and then lease the facility back to the board of education until the building has been paid for over a period of years.* This is a form of lease-purchase arrangement.

Leasing of facilities by the local school district is legal in every state and serves as a useful vehicle for housing students for both short-term and long-term periods. There are a variety of arrangements for leasing facilities that may be beneficial to a school district as an alternative to constructing a new facility. Analysis of cost of ownership versus leasing should be made to determine the feasibility of either approach.

Pay-As-You-Go. Under this method of financing, school systems construct facilities segmentally over years, as funds become available through the current tax revenue of the district. This method is virtually the same as paying cash for the building. Many problems are associated with this method of financing, not the least of which is the vast coordination and planning needed to ensure that the facility is completed when, where and according to the needs of the educational program. An additional problem is that this method does not keep up with any inflationary trend in construction. Very few school systems use this method of financing school buildings.

Sinking Funds. This method of funding capital projects enables the school district to set aside, each year, money to be used in the future. When the school district has saved the money, it constructs the facility. This method of funding capital projects is not legal in every state nor can it keep up with the inflationary trend in construction.

Bonding. The most common method of obtaining funds for construction is through bonding, by which the local school district enters into debt to obtain the funds following a successful bond issue vote. School bonds are paid off through the debt service portion of the operating budget using current tax revenue.

Two types of bonds may be issued following the bond election—term and serial. All term bonds of a given issue mature on the same date and are redeemed at that time. Serial bonds mature at varying periods of time ranging from five to twenty years and each series is redeemed at maturity. Interest on these tax-free bonds is paid during the life of the bond.

Bonds of all local governmental units including school systems are classified as municipal bonds and are currently tax-free. This advantage enables the school district to obtain lower interest rates than other types of bonds. School bonds are general obligations bonds in that the full faith and credit of the school district or local governments is pledged for the redemption of the bond. The services of a

bond attorney should be secured by the school district anticipating a bond selection to ensure meeting all legal requirements of the particular state and locality.

Non-Tax Revenues. Some school districts are able to sell sites or other real estate and property that is not in current use to obtain funds for needed capital projects. Such funds would be considered as non-tax revenues in that the school district obtained funds without increase in the tax rate. Other forms of this method might be selling or leasing ground or air-rights over school property or construction of educational facilities that have rentable space. An example of the latter method of securing facilities would be where a private firm might construct a building on a school site and then enter into a long-term lease with the school district whereby the school district would pay for the use of a portion of the building that is being used for school purposes. There are several advantages to this scheme, including the tax revenues generated from the developer.

Capital Improvement Program. The CIP of a local school district is a document that lists and projects all capital needs for the future. Such a program usually covers a period of time (such as five years), although some governmental units extend the program for ten to twenty years. Some states mandate by law the format and limits of the local CIP. All of the capital projects including planning funds, site purchase, new construction, renovation of existing buildings and maintenance items for all existing facilities are included in the document. The purpose of the CIP is to allocate limited resources over a period of years to prioritize projects in order to accomplish the listed physical items. Without some form of prioritization of projects, it would be difficult to keep all existing buildings in good order and provide for future physical needs. Each year the programs are updated by deleting those projects that have been funded and completed and adding new items that need to be completed. The document is then reviewed and approved by the board of education. The CIP also contains a section termed the annual capital budget. Inasmuch as a budget is an approved expenditure plan, the capital budget contains the authorization and funds necessary to complete each item listed for that specific year. Each year the board of education publicly reviews and then approves the capital budget and the CIP.

Funding of the capital improvement budget can come from both regular tax revenues and through borrowing by means of a bond issue. Each school district should maintain a current CIP and approved capital budget to meet the ever-changing physical facility needs of the community.

Site Selection and Acquisition

Selection and acquisition of suitable sites for school facilities are a very important part of the school planning process. Acquiring the proper site for a school facility has a tremendous impact on the potential for service to the community. Often such a site is unattainable. In fact, obtaining good sites for schools is more difficult today than at any time previously. Reasons which account for this phenomenon include: competition for sites by the commercial sector; the increase in site size to accommodate an expanded educational program; the inflationary rise in land prices; and, in urban areas, the movement of people into heavily populated areas where there is little open land. As a result, educators now must consider sites that they might have rejected previously.

Several imaginative schemes have emerged from the shortage of sites. Such plans include the placement of school programs on docked ocean vessels, like the Queen Mary or Queen Elizabeth, in unused suburban train stations, over highways and even in existing community and commercial facilities. Only the latter has been implemented in the Parkway School in Philadelphia. The others illustrate the extreme to which educators have felt compelled to go for school sites.

Almost everyone wants a new school when it is needed, but no one wants the facility located next to their own property. The reasons for this paradox normally is centered on the intrusion of large numbers of youngsters presumably generating too much noise and traffic. Some persons have the ungrounded fear that a school located adjacent to their property will have a negative effect on their property's value. Karl Grube pointed out that the neighborhood school site has a positive economic effect on surrounding property.[9] He studied a locality in the Midwest where a new school facility was constructed and found that property values actually increased over a period of years.

All of the foregoing points to the fact that the selection of a school site is one of the most controversial issues educators face in planning a new school. The process is so controversial that some school systems conscientiously do not involve nor notify community members that a site for a new school in the community will be selected. This is particularly true in large school systems where the political process is volatile.

In a survey of the ten largest school systems in the country, respondents in a majority of systems indicated they do not involve community people in the selection process. Their reasons included fear that local political problems might spill over into the selection process and delay approval of the proposed site or prevent the school district from acquiring the site altogether.[10]

This exclusionary practice, however, is not universal. Many school districts, as a matter of policy, involve community members in this phase of school planning.

The process of selecting a site for a school facility normally hinges on the long-range development plan of the school district. As stated earlier, the plan should identify those areas of the school district where growth and development will take place and then identify generally those neighborhoods where and what level of schools will be needed in the future. The data from the Long-Range Development Plan are then entered into the CIP for the appropriate year for when it will be funded. When the particular project for selecting a site becomes funded, the appropriate office or agency in the school district is then authorized to initiate the selection process.

Selection Process

The selection of a site entails three tasks: developing criteria to govern the selection of a site; applying selections criteria to each prospective site; and approving the selection by the board of education.

The actual selection of a school site involves many organizations and persons with a variety of skills. The site team may include any and all of the following: educational administrators, educational consultants, architects, urban and regional planners, landscape architects, recreation planners and legal counsel.

Each person or organization contributes to the process as the need demands. The major share of responsibility falls with the school district administrators, educational consultants and architects because much of the data that are needed to develop and apply criteria is generated by these individuals or the offices they represent. This is the group that must develop the criteria and then apply them in making their recommendations to the board of education. The team is headed by a responsible school district administrator who assists the group in completing the task. After the criteria have been identified and approved, the team identifies potential sites for consideration. Several sources of data can be used by the team to obtain data regarding potential sites. Such sources as the following are helpful to the team: 1) the comprehensive regional, urban or community land use maps; 2) aerial photographs; 3) re-development authority maps and official minutes; 4) an actual tour of the proposed area to be served by the new school.

Site Selection Criteria. The site team develops a set of criteria based on the educational requirements of the proposed school. They then use these criteria to evaluate each potential site. The criteria may vary from school district to district and from one geographic area to another, but certain similarities in all criteria used by school districts. The CEFPI suggests that the criteria address the following questions:

- Will the site support the educational program?
- Is the site's location convenient for the majority of pupils?
- Is the site the right size and shape?
- Is the topography conducive to desired site development?
- Is the general environment aesthetically pleasing?
- Is the site safe?
- Is the air quality healthful?
- Is the site free of industrial and traffic noise (both air and ground)?
- Does the land drain properly and are other soil conditions good?
- Does the site have desired trees and other natural vegetation?
- Is water available?
- Is the site near community services—library, parks, museums?
- What is the relation of the site to existing educational facilities?
- How is the surrounding land zoned? Will its development enhance the school site?
- Are utility services available?
- Is the site served by public agencies—police, fire department, etc.?
- Is the site easily accessible to service vehicles?
- Is the site available?
- Is the price affordable?
- Can the land be shared with other community facilities and organizations, especially parks?
- Will the site provide desirable open space for the community where it is needed?
- Is the site expandable in the future?

In addition to the above questions, the criteria should address important community concerns including the impact the acquisition of a site has on existing housing

and the district's desegregation plan. Especially in urban areas where adequate, existing housing is so valuable, displacement could induce a community response that could adversely affect the purchase of a site. Of course, the final criterion for any site is whether a particular site can pass political muster. The selected site must be politically acceptable or, at least, not unacceptable to the power structure of the community before the board of education can take any action.

Testing of the political acceptability of any potential site is usually done informally; however, in most areas the selected site is approved by the regional or urban planning commission as a matter of formality. In so doing the political power structure can make its desires known. In populated areas, a school site is usually designated long in advance of need by the local governing body after consideration of the long-range development plan of the political sub-division. In this manner the judicious placement of such community resources as schools, recreation areas, parks, libraries and other facilities are determined on a broader basis, designed to serve the whole community.

Application of Criteria. In developing a list of potential sites, certain general criteria apply before a site is placed on a list of potential sites. The team looks for sites that meet basic predetermined standards. Once the list of these sites has been developed, the team evaluates each site both objectively and subjectively. Objective comparisons will be based on such data as: size of parcel, price of the land, distance of utilities to the site, soil percolation, quality of the air and location and distance of the clientele to be served. Subjective judgments may be based on: the aesthetic environment, impact of the proposed school on the neighborhood, use of other community services, marketability of the site and adaptability to future grade-organizational changes.

After applying the criteria to each site, the team narrows the list of potential sites to one or two. If the school district has several promising sites to consider, they may want to compare the two best sites in the final stage. Often, however, school systems do not have the luxury of choosing among several sites, but are limited to selecting from two possible sites. In this case, the site team may want to conduct a physical examination of each site before formally applying the criteria. Additionally, some school systems have some soil testing and inspection by licensed engineers completed before making a decision. After evaluating all available data the site team makes its recommendation to the board of education for consideration—approval or rejection. If approval is given, the board of education then authorizes the legal counsel of the school district to obtain the site.

Site Acquisition. A school district may obtain a site in any of four ways.

1) Negotiations with the owner and subsequent purchase
2) Condemnation procedures and subsequent purchase
3) Acceptance of a gift of land
4) Receipt of surplus governmental property

The most common method of obtaining a site is through negotiation with the owner and subsequent purchase. The vast majority of sites are obtained through this process in a straightforward manner, with the proper board of education representative conducting all of the negotiations. There are, however, instances when the owner and the board of education cannot resolve the purchase price for a site.

When an impasse in negotiations for the purchase price of a site occurs, the board of education has recourse through the exercise of the right of eminent domain. This right stems from the state; by virtue of the fact that the local school district in every state is a subdivision of that state, it possesses the right of eminent domain.[12] This is the right to directly obtain a parcel of land when the owner refuses to sell, regardless of the reason. The process of obtaining a site through this method is called "condemnation." A board of education passes a resolution to the effect that a particular site is needed for school purposes, and a proper disposition is made to the designated local court to that effect. The court then conducts proceedings to determine the equitable price of the parcel of land. This is done by having the court either appoint appraisers or by receiving appraisals from the school district and owner. In either event, the court determines the equitable price of the land and the school district obtains clear title to the site on payment of the determined price. This process of securing land for schools is not often used because it is very time-consuming and can result in a public relations problem of gigantic proportions. Nevertheless, in special situations a board of education may choose to use this method.

In cases where patrons or organizations donate a parcel of land to a school district, the board of education can use the gift of land for a school site, sell the land and use the proceeds of the sale for any important purpose or exchange the land for either a different site or other physical facilities. The general rule concerning gifts is that the board of education can accept gifts and may use the gift in whatever manner deemed prudent and for the benefit of the school district. The deed to the land, however, may have a codicil to the effect that the land can be used only as a school site, in which case the board of education must use the gift only in that manner. If the site is not used for a school facility, the title to the land may then revert to the original owners.

In some areas of the country, state and local jurisdictions have enacted ordinances to the effect that developers of large tracts of land for housing purposes must deed a certain amount of land for public services such as a school, fire station, library or other functions. In lieu of the dedication of land, the developer may pay a lump sum of money to the local government equal to the cost of land that would normally be dedicated.[13] Where such ordinance or restrictions are in effect, the board of education must work closely with the appropriate planning department of the local government to ensure that the dedicated tract of land will indeed serve the functions of the school district.

The fourth method of obtaining land for educational purposes is through the surplus property programs of either the federal government or in some cases the particular state. The instances where local school systems have obtained useful sites for schools through this means is very limited. But the federal government and selected states do on occasion declare real property surplus and available for the local governmental use. Although the needs of the school district and the availability of property from other governmental units seldom mesh to the benefit of both parties, there have been instances where arsenals, parks, camps and other types of real property have passed onto school districts for good use in housing the educational program. School districts are usually notified when such property will become available for disposition.

After the board of education has authorized the purchase of a certain site for school use, the appropriate representative of the school district negotiates the pur-

chase price. The board of education then must agree to that price and give the negotiator the authority to draw up the contractual documents to obtain the site. In all states the local school district must use the services of legal counsel to inspect the title and to draw up the documents for the purchase.[14] It is important that the school district obtain and hold a clear free simple title to the property to protect their rights to any subsequent facility that is constructed on the site. The local board of education holds the title to the land for all sites owned and controlled by the school district.

The Design Process

Architectural Services. When an architect is employed by a school district, certain standard services can be expected to be performed in designing a capital project. Five basic services or phases of service of the project include:

1) Schematic design
2) Design development
3) Preparation of contract documents
4) Monitoring the bidding or negotiations
5) Supervising the construction[15]

Services that are required of the architect are specifically covered in the contract document that the school district and architect negotiate and sign. The specific provisions of the relationship between the school district and the architect must be identified and explained in that document.

Occasionally, there are pre-design planning activities in which the architect is engaged by the school district. Such activities are usually covered in the standard contract document along with other services. Some architects consider pre-design activities separate from basic services.

Pre-Design Planning. The tasks to be completed in this phase of development are the selection of the site and the preparation of educational specifications. Often, school systems have the architect serve as an adviser or observer to this process, but the actual work of selecting the site and preparing the educational specifications is reserved for an educator. Local practice will usually determine the extent of involvement of the architect in the pre-design planning process. The most beneficial use of the talents of an architect at this stage may well be in providing advisory-technical assistance to the site selection team.

Schematic Design. This phase of project development begins with the educator translating the educational needs of the school district, as expressed in the educational specifications to the architect. This phase is followed by a period of intense interaction and communication between the educator and the architect, in which several concepts or designs are reviewed. The result of this phase is a set of line drawings of the entire facility. At this stage, the board of education reviews the work of the architect (as represented by the schematic drawings) and approves the work to date. This is an important milestone of the project, for it is at the point that the basic building design is set and little deviation in the exterior structure of the building can take place in the future. The interior of the building, however, will change during the next stage of development. The school district must review the design during this period to ensure the proper development.

Design Development. After the schematic design is approved by the board of education and any other necessary governmental agency, the architect then proceeds to develop and refine the drawings. There is an intense dialogue between educator and architect while the design is being refined. The plans and other construction documents are then prepared. This period of time may cover from six to thirty months depending on the complexity of the project, and the administrators in the school district must constantly monitor the progress and work of the architect and the architectural staff in developing the design of the facility.

Preparation of Construction Documents. The architect is responsible for the preparation and production of the formal construction documents. These documents consist of a complete set of working drawings and a set of technical specifications.[16] Some variation may exist between states and regions, but the working drawings consist of a series of drawings that are prepared along the lines of the various disciplines: architectural, structural, heating/ventilation/air conditioning (HVAC), electrical, plumbing, fire protection, interior design and landscaping. Depending on the complexity of the project, the documents may include all of these, or they may simply contain the architectural, electrical, plumbing and HVAC drawings. In any event, the working drawings are the drawing documents used by contractors and builders to prepare bids for submission to the school district.

The second part of the contract documents is a book called "technical specifications." This document contains: 1) bidding documents that contain the bidding instructions and other legal conditions; 2) conditions of the contract including general and specific provisions that will govern the relationship between the contractor and the school district; and 3) technical specifications that provide a detailed description of all material and workmanship to be used in the facility.[17] Sometimes, school districts provide much of the material for the technical-specification portion of the document because they want to specify the type of material (or equipment) to be used in the new building. School systems may desire uniformity in the various components and materials for buildings owned and used by the school district. In such cases, the school district would require the architect to write specifications for material that would be exactly like the corresponding components in the existing buildings. For example, some school districts prefer that all door and window hardware, or similar components of all buildings, be the same because of the ease in replacing damaged or worn parts, and the efficiency of warehousing the various components.

The technical specifications may be written as either performance specification, where the results or performance of a product are desired, or as descriptive specifications which describe the actual product. Most school systems use descriptive specifications, including those school districts that desire uniformity in building components.

Monitoring the Bidding Process. Depending on the size of the school district, the architect provides several services in this stage of the project such as: preparing the bid advertisement, issuing bid documents, answering questions and inquiries regarding construction, evaluating the bids and assisting in the preparation of the contracts. Usually the legal counsel of a school district completes all legal requirements of the bidding process such as preparing the advertisement and preparing the contract, but the architect may assist the legal counsel by providing data regarding

the project to be included in the legal documents. The architect may assist the school district by interesting potential bidders in the construction project and, in turn, providing lively competition that can result in lower bids.

In cases where it is necessary to negotiate with contractors regarding a bid, the architect can present the needs of the school district. In some states, school districts negotiate with the lowest responsible and responsive bidder when that bid is over the budgeted amount. In such circumstances, the architect can provide the school district with alternatives in the desired facility and identify economy options that may assist the bidder in meeting the needs of the school district. The school district may, therefore, proceed with construction rather than reject all bids, re-design the facility and re-bid the project. These options may only produce higher bids because of inflation or delay the project beyond the date desired.

Some states allow school districts in certain circumstances to negotiate with construction management firms to complete a building project, rather than submit the project to competitive bidding. Where this is allowed, the school district that already has an architect under contract may use that person in the negotiation process with the construction management firm.[17]

Construction Supervision. The services offered by the architect during the construction phase often are not completely understood by the educator. As a result, the school personnel are not always sure of what to expect from the architect and the architect's staff during this period. Certain tasks that the architect must do to discharge his responsibility are required during this phase of the project under the basic services section of the contract. They include:

1) Representing the owner
2) Making periodic visits to the construction site
3) Approving payments to the contractor
4) Interpreting the requirements of the contract and rejecting work which does not conform to contract documents
5) Approving shop drawings
6) Preparing change orders
7) Conducting inspections to determine dates of completion
8) Issuing the final certificate for payment of the contractor[18]

The assistance of the architect during the construction stages in interpreting the requirements of the construction contract whenever questions arise, is vitally important to the success of the project. When the project is completed, certain required activities are demanded of the architect, including securing bonds and guarantees and issuing the final certificate for payment of the contractor. The latter officially completes the work of the architect.

Although not stated specifically in the normal contract, the architect is usually involved in orientating the school's staff to the new facility. This service is often given free to the school district. Proper orientation is particularly important for engineers and custodians who will be responsible for the mechanical systems of the facility. With sophisticated HVAC systems, the engineer and custodian need to understand the proper functioning of the equipment.

Additional Services. The school district can reasonably expect the architect to provide the above basic services, but should additional services be required, the school district must contract separately with the architect for the work. This contracting is done by an addendum to the architect's contract. Services that are outside the realm of what is normally considered basic architectural services include:

1) Assisting in site selection
2) Constructing special analyses and studies of the owner's needs beyond those called for in the schematic design
3) Making measured drawings of existing buildings
4) Providing detailed cost estimates beyond the statements of probable costs called for in the basic services
5) Providing interior design and services for special selection of furnishings
6) Planning surveys and site administration
7) Reviewing previously approved drawings to make changes not initiated by the architect
8) Furnishing additional services resulting from default of contractors or other similar events over which the architect has no control yet which involve for him or her significant additional time and cost
9) Providing post-occupancy evaluation services.[19]

One area that causes confusion is the supervision of construction. The usual American Institute of Architects (AIA) contract does not provide for daily supervision of the construction project; in fact, it calls only for periodic visits by the architect or the architect's staff. Should the school district desire such supervision from the architect, an addendum to the contract would be needed to account for the extra cost of this service from the architect.

Another way to handle the day-by-day supervision of the construction project is for the school district to employ its own supervisor. This method offers the advantages of reducing costs and giving the school district its own employee (not an employee of the architect) on the scene every day. School districts need to have such daily supervision to protect their investment and to ensure the timely completion of the project with the desired types and kinds of workmanship.

Fee Schedule. Several methods exist for compensating an architect. The most prevalent is by using the construction cost of a facility as a basis for determining architectural fees.[20] Under this procedure, architects are paid a certain percentage of the construction cost. The percentage varies with the amount of construction to be done and with the negotiating process. Some states have published guidelines for percentages of construction cost to be used in employing an architect. The state chapter of the AIA also can supply a list of suggested percentages to be applied in negotiating a contract.

The construction cost consists of the cost of completed construction for the project less cost of the land, right-of-way or similar costs. When the school district negotiates a contract with an architect, the method of compensation is determined and becomes a part of the contract. When services outside of the basic architectural services are desired by the school district, architects are compensated separately from the basic fee. The usual fee for such additional services is the cost of direct personnel services plus reimbursable expenses, where the personnel costs are the salaries of professional, technical and clerical employees and their benefits.

Like the contractor, the architect will expect to be paid periodically using the progress of the work. Although the school district and architect may set any mutually agreeable payment schedule, an initial payment of five percent of the total fee is frequently made to the architect when the agreement is signed. Payments are usually made on a monthly basis, in proportion to the services rendered. The following schedule of payments is taken from the AIA agreement, Document B141

and defines the percentage of the total fee that should be paid at the completion of each of the basic service phases:

- Schematic Design 15%
- Design Development 35%
- Construction Documents 75%
- Bidding and Negotiation 80%

Construction 100%[21]

Provisions in the architectural contract must also be made for the disposition of payments to the architect if a project is suspended for a certain amount of time or is abandoned in part or in whole.

Architectural Contract

When the school district has chosen an architect, a contract is signed following the official board of education resolution of selection. The school district may use a contractual document that is prepared by its legal counsel or they may use the standard AIA Document B141: Standard Form of Agreement between Owner and Architect. Should the school district decide to write its own contract, the assistance of a competent architect will be needed by the legal counsel to advise on the needed services and to make provision for all conditions. Inasmuch as the contract represents a considerable amount of money and delineates the exact relationship between the board of education and the architect, care must be exercised in writing the document to ensure that all exigencies are covered. Certain advantages exist in having the legal counsel of the board of education write a contract particularly in addressing local customs and circumstances deemed important to the school district.

Architect Selection

An architect is a professional who usually has eight or more years of advanced study and training. In all cases, the architect has passed a state qualifying examination and is normally a member of the AIA which mandates a code of professional ethics.[22] An architect brings a strong sense of dedication and service to the school district in designing facilities to house students. Not every architect, however, can work successfully in the atmosphere of a public school district where there are many levels of approval. Therefore, in selecting an architect, the board of education must make certain that the successful candidate understands the problems and complexities inherent to public governmental organizations such as school districts.

There are three methods of selecting an architect: direct employment, design competition and comparative selection.[23] Direct employment is where a school district contacts one architectural firm and enters into a contractual arrangement to design the capital project. Most often such a method is used when the architectural firm has done work previously for the school district or the school district is situated in a rather small community.

With the design competition method, the school district holds a competition among selected or invited architects who submit designs for the capital project. The contract is awarded to the architect who submits the "best" designs. Most

architects do not favor this method, since it requires them to expend considerable resources up-front without any way to recoup if not selected as the successful bidder.

The great amount of time and effort put into the competition by the school district does not necessarily bring better results or even as good results as the comparative selection method. This method of selection is the one most used by governmental agencies throughout the country. Under the comparative method architects are evaluated on the evidence they submit to the school district and the data collected by school district personnel through interviews and visits to former clients and facilities. The successful candidate is selected based on the evaluation done by the school staff and board of education.

Time spent by school district personnel in obtaining information and impressions about prospective architects enhances the district's chances of selecting the right person. The steps to be observed in the comparative selection method are:

1) Identify the pool of interested architects. Obtain names from the AIA Chapter, colleagues in education and the telephone directory.
2) Send out to the above information about the project and a questionnaire seeking information about the firm.
3) Review materials sent by architect firm's capability statement and completed questionnaire.
4) Identify five to ten firms that seem capable and interested. Send an additional questionnaire seeking further information including names and addresses of former clients and facilities that can be visited.
5) Review the material from the above firms and evaluate them so that the list is reduced to three firms.
6) Conduct an intensive background investigation on the three firms by contacting former clients and colleagues and visiting facilities designed by the prospective firms.
7) Hold interviews with the three architects and their staff to gather first-hand impressions and additional data.
8) Visit the offices of each of the firms in order to gain an impression of employees working atmosphere.
9) Select one firm from the list of three based on the visits, interview of the candidates and interviews of former clientele.
10) Present the candidate firm to the board of education.[24]

Most of the work, if not all, is done by school district's staff and not by members of the board of education, because administrators have more experience in interviewing and selecting personnel than most board of education members. School administrators should be given the responsibility of making the investigation and making the recommendation to the board of education. Recommendation of a competent architect who is also capable of working with a complex organization such as a school district is not an easy task and should not be relegated to persons who cannot spend full-time doing the task.

Criteria for Selection. Criteria to be used in evaluating an architect should be developed by the school district staff members, but input should be encouraged from all segments of the district and the board of education. Some of the more significant points to be considered when establishing criteria are:

1) *Registration and Professional Activities.* The architect must be licensed by the state and should be a member of the American Institute of Architects.

2) *Experience.* The architect should have experience in designing the type, kind and size of project that the school system needs. Experience in designing a school might be beneficial, but more important is whether or not the architect has worked with a school organization.
3) *Quality of Work.* The school system will want to interview clients of the architect to ascertain how they feel about the work performed by the architect. Contracting firms can also be a source of information regarding the preciseness of the documents produced by the firm as well as the relationship between the contractor and the architect. Observing and evaluating buildings designed by the architect will give further insight into quality of work.
4) *Staffing and Facilities.* The size and quality of the architect's office and staff may be of concern to the school system. The complexity of the school project may demand considerable expertise that the architect should be able to document and produce. School system personnel have to make a judgment as to whether or not the firm can handle a project the size in question. Judgments need to be made about the capability of the staff based on information submitted by the architect and gathered during a visit by the school system personnel to the architect's office.
5) *Method of Operation.* Working with a school system is significantly different from other typical architectural clients in two respects: 1) obtaining approval from various persons and groups within and without the organization; and 2) presenting ideas to a large number of persons and groups. The school system should contract with an architect who feels comfortable working within this type of environment. Architects who have had previous experience working with school systems and, therefore, "know the ropes," can be expected to work efficiently. Architects who have not had such experience but who, in the determination of the school personnel and board of education, possess the ability to work within such an organization should be considered for employment and then oriented properly to the planning mode of the school system so that they can work to the best of their ability.[4]

Obtaining a competent architect who will meet the needs of the school district is one of the most critical tasks in the planning for a school facility. Much of the success of the whole project rests with this one decision. Having the appropriate architect in the employ of the school district will enhance all of the other planning efforts of the school personnel, and contribute greatly to the success of the capital project. This is why much time and effort goes into the process of selecting the architect.

Even with the best architect under contract, however, the success of the project is assured only if the proper architect/owner relationship is observed. The architect's job is always to be in an advisory capacity. The architect does not make decisions for the school district; the architect suggests solutions to problems raised by the school district. The educator must exercise the leadership necessary to present the problem correctly and in sufficient detail to the architect so that the architect can offer effective solutions for consideration. This means that the educator must carefully detail in writing the needs of the school district and then take the necessary time to translate these needs and evaluate the solutions offered by the architect. The architect does not work in a vacuum, but rather works in conjunction with the owner, who in this case is the school district, to develop the design of the facility.

Developing Educational Specifications

The process of planning for school facilities, whether new construction or renovation of existing structures, is a complicated series of interrelated processes, starting with identification of need and proceeding through the final phase of occupying the new facility. One of the processes in the comprehensive planning for school facilities is the development of a set of educational specifications. For many reasons, this process is often the weakest link in planning facilities. Reasons why educational specifications are not more widely developed include:

1) The default on the part of educators in assuming the leadership responsibility for developing educational specifications.
2) The belief that some educators do not know how to direct the process of developing clear and concise educational specifications.
3) The vague demarcation of responsibility between the educator and the architect.
4) The desire on the part of the architect to provide extra services.
5) The misbelief that the school system does not have the capacity and/or the staff to do the task and cannot afford to purchase outside assistance.[28]

Roles and Responsibilities

For most educators, planning and constructing a new facility or remodeling existing facilities are not common occurrences. Planning a new school facility in the average school district is perhaps a once-in-a-generation happening. Consequently, educators are often unfamiliar with the separation of responsibility and relationships among participants in the planning process for a capital construction project. This is especially true in the design phase.

The School District. The board of education is the owner of all facilities in the school district and acts in that role. The superintendent is the chief administrative officer of the board of education and in this role makes decisions regarding every capital project within broad guidelines. The board of education does make certain major decisions in the process of planning, designing and constructing facilities, but the superintendent and staff augment these major decisions with daily decisions that enable the project to proceed in an orderly and timely fashion.

The Architect and the Design Team. When a school district is faced with a capital construction project of any kind, it is necessary to obtain certain expertise such as architects and engineers to help complete the project. Following the procedures outlined in the preceding section, the board of education contracts with a firm, corporation or individual to provide the architectural expertise necessary to complete the design of the proposed capital project. In turn, the architect organizes a team of individuals that will work on the project and provide certain expertise necessary for the success of the project. This team is usually called the "design team" and is headed by an architect charged with the major responsibility of the design work plus the engineers who will design the electrical, mechanical, structural and HVAC systems.

During the course of the project, the design team may be augmented by other individuals such as acoustical engineers, color consultants, soil experts, educational consultants, landscape architects and perhaps even energy consultants. This group, along with the appropriate number of draftsmen and other technicians, will

design a facility and produce a set of documents and working drawings that will be used to tender a bid.

The Design Review Team. On the other side of the design process, there should be designated a group of individuals who serve as the reviewing agent for the board of education. This group of school district employees is usually called the "design review team." The task of the design review team is to review and approve the work of the design team in preparation for board of education approval.

The composition of the design review team may vary from state to state and from school district to district, but it is imperative that one person with authority act as representative for the local school district throughout the design and construction phase of the project. This person should be the same one who heads the entire school planning effort. The major duties of this person, usually designated as educational planner, include: heading the design review team, interpreting the educational program to the architect, coordinating the local reviews, submission for the state approvals and most importantly making the necessary decisions, in cooperation with the rest of the design review team, in a timely fashion to ensure completion of the project.

Working Relationships. Figure 23:1 illustrates the members of the design team and the design review team and the relationship between the two groups during the design phase.

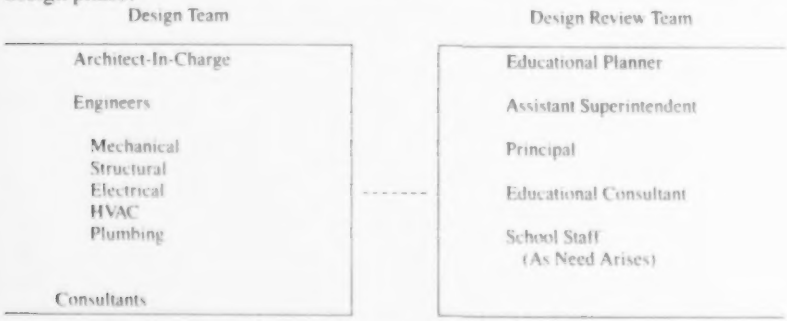

Figure 23:1 Design Team/Design Review Team Relationship

The interface of these two groups is an extremely important one for the success of the project. This interface is extremely close and is continuous during the design phase of the project. During a very intensive design process the interface may be on a weekly basis and in certain instances on a daily basis. But this interface should be continuous and for the benefit of both teams in working through the project.

During the design phase of any capital project, members of the design review team should be able to take a broad view of the project in terms of both time and space. They must recognize the need for a flexibility that will meet changing programs and yet provide adequately for the present. They must recognize that compromises are inherent in any design process. Those members of the design review team who are responsible for the review of the total concept must consciously keep priorities and programs before them and assume initiative in requesting information that will enable them to make intelligent decisions concerning development of the design. The design review team cannot abrogate this leadership responsibility and expect the design team to anticipate all of their conditions.

It is also extremely important to establish early, close working relations with all members of the design team. The most propitious time to employ an architect is long before any design work is needed. On almost every capital improvement project, both architect and engineer can provide data to help educators make early decisions regarding the facility. There are fewer problems in projects where members of both the design team and the design review team meet early and establish good working relations.

Evaluating Proposed Designs. In order to properly evaluate any proposed design work of an architect, it is necessary to have firmly in mind what the intended facility is to accommodate in terms of activities, programs and personnel. The basis for that knowledge is the approved set of educational specifications. This document will serve as the guide in evaluating the suggested designs of the architect during this stage of development.

The design stage of the school-planning process, however, should be viewed as a period of time where the architect develops, from a clear set of educational specifications, the design of the proposed facility beginning with the very initial concept through the schematic stage to the working drawings and bid documents. The design review team works closely with the design team during this stage to facilities the process, to assist in translating educational needs and to systematically review the work of the design team. The design stage may take as little time as six months for a rather small capital project, to as long as thirty months, for a more complex project such as a large high school.

Plan review should occur regularly during this period. The intensity and frequency of the review will depend to a great extent on the type of project designed and also on the stage of development. The design review team should not allow any significant amount of time to elapse without review and approval of segments of the plans. A close monitoring of the project needs to be maintained at all stages of development.

There is no easy way to learn how to read architectural drawings; no short course is offered by the colleges to help non-architectural persons read what is contained on the drawings. Competence in reading and evaluating proposed design plans may be gained from experience. Being in a position of having to review plans and designs is the most effective teacher. In the beginning, educators often ask simple questions that afterwards appear to be obvious. But in this manner, educators begin to notice what they should look for in a plan. Educators should review architectural drawings as though they were going to use the facility themselves. By looking at the plans from the standpoint of a teacher, custodian or administrator working in the building, or as a student using various parts of the facility, persons responsible for approving designs will be able to identify difficulties. The responsibility of raising questions remains with the members of the design review team and cannot be abrogated.

The design review team must also be prepared to raise questions regarding the use of building materials, initial costs, maintenance costs, lifetime operating costs, energy conservation measures and other unusual design features proposed. In addition, some school districts retain an educational consultant to assist their employees in the preparation of educational specifications and the review of architectural plans in relation to that document.

The Construction Process

After the architect has completed the design of the facility and completed the contract documents consisting of the working drawings and technical specifications, the school district is ready to enter into the bidding stage. Before any bidding, the board of education must decide whether they desire to enter into a contract with a single contractor or with several contractors. In some states it is not permissible to enter into one contract, and the board of education must sign contracts with contractors representing the different divisions of labor.[28] After the decision has been made, the final bidding documents are prepared by the architect.

The Bidding Process

There are usually five steps involved in the bidding process.

1. Locating bidders.
2. Issuing and retrieving documents.
3. Receiving and tabulating bids.
4. Analyzing the bids.
5. Awarding the bids.

Locating Bidders. School systems must advertise the bidding of the project, and this is the formal method of notifying potential bidders. Often the architect can be instrumental in securing interested potential bidders.

Issuing and Retrieving Documents. In the advertisement, the school system identifies the location of the bidding documents (board of education office, architect's office, other locations). The procedures for obtaining the documents are also set forth. Usually a potential bidder must deposit a certain amount of money in order to obtain the documents. The deposit is usually refunded when the documents are returned. This type of check-out system allows the architect to have some control of the documents and to recover the sets of plans.

Receiving and Tabulating the Bids. Bids must be received at the pre-determined time and place set forth in the bid documents. The bids that have been received are opened by the representative of the board of education and tabulated. The bidders usually attend this public opening of the bids. The bids must be submitted with a surety bond indicating that the bid is genuine and that the contractor is able to accept the offer of a contract should that bid be the one selected. Although the amount of the bond may vary, it is customarily equal to fifty percent of the bid that is submitted to the school district.

Analyzing the Bids. Analyzing the bids should be done carefully by both the school personnel and the architect. The architect can provide a great deal of assistance in this stage by evaluating the bids and the firms making the bid. School systems are by law required to award the contract to the lowest responsible and responsive bidder thus not only is the amount of the bid evaluated, but also the technical specifications. Helping to determine the adequacy of the latter is where the architect can have the greatest input into the decision. When alternate bidder arrangements are permitted, the architect must help the school personnel make the difficult decisions regarding the various alternative bids and the consequences of each alternative. It is possible for school systems to reject any and all bids, if they are above the budgeted amount for the project. It is also possible for school systems to negotiate with the lowest bidder on the type of the work and subsequent price to

arrive at an acceptable bid. The architect must then reduce the scope of the project while giving the school system what it needs and be able to negotiate with a bidder.

Awarding the Bid. After the bids are analyzed the architect makes a recommendation to the school staff which then considers the bids and recommendation and in turn makes a recommendation to the board of education. In a formal resolution of that body, the bid is awarded and the legal counsel of the school system draws up a contract to be signed by the successful bidder and the board of education. This contract is then the basis of the construction work performed to erect the facility. When the contract is signed, the successful bidder gives a performance bond to the school district. This is a guarantee that the contractor will do the job contracted to do including all plans and provisions. Usually this bond is not less than 100 percent of the contract price.

Following the formalities of contract award and signing, the contractor begins to mobilize the work force in anticipation of executing the contract.

The Construction Contract

There are several contractural arrangements a board of education can enter into regarding a capital construction project. In all cases the board of education must procure services through a competitive bidding or negotiation process. While the end result of any procurement arrangement is basically the same, the relationship between the board of education and the firm responsible for constructing the building is somewhat different in each arrangement. Some of the standard contractural arrangements are:

1) Single Contract (lump sum)
2) Construction Management
3) Design/Build[29]

Single Contract. The Single Contract arrangement is the most conventional approach and is utilized by the vast majority of public jurisdictions in securing services. Traditionally, a school district enters into a capital construction project after completing the educational planning stage and having the facility designed by an architect. Following the acceptance of the design, the project is tendered for public aid. When the bid process is completed, a contract for construction is let to the lowest responsive and responsible bidder. Figure 23:2 illustrates the traditional relationship between the board of education, the architect and the contractor.

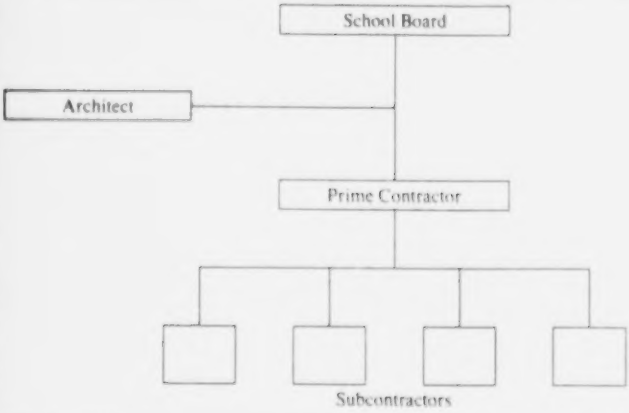

Figure 23:2 Traditional School Board/Contractor Relationship

The prime contractor secures the services of necessary subcontractors to provide for the mechanical, structural, electrical and plumbing systems. Under this arrangement, the prime contractor is directly responsible to the school board.

In some states, public jurisdictions are required to enter into separate contracts along the lines of the disciplines of the sub-contractors. With this type of arrangement, the public jurisdiction must then provide for the coordination between the contractors either through their own personnel or through outside assistance. Figure 23:3 shows the relationship between the school district, architect and contractors under this arrangement.

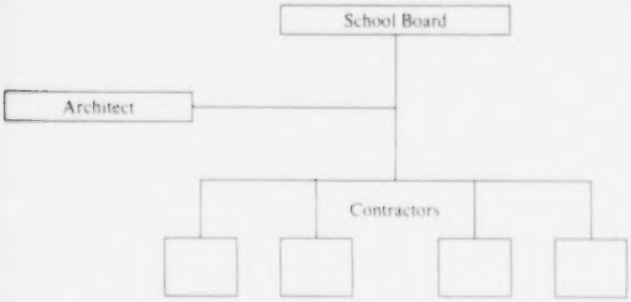

Figure 23:3 Multi-Contract Relationship

In large school districts, the type of coordination necessary to successfully complete the project is not a serious problem because personnel are readily available in the school district to do the work. In small school districts, it is often necessary to look outside of the school for the needed personnel to coordinate the work. The

situation with the small schools seems ready-made for a newer type of service relationship known as "construction management."

Construction Management. The Construction Management contractual arrangement is shown in Figure 23:4.

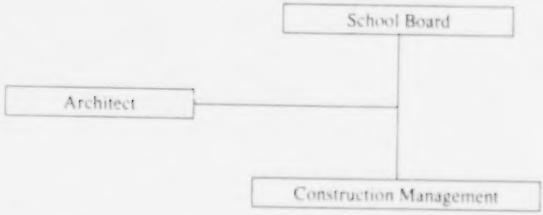

Figure 23:4 Construction Management Relationship

While the construction management arrangement may seem similar to the conventional approach of using a prime contractor, they differ in the area of responsibility.[30] As commonly practiced, the construction management firm is employed by the school board to provide a continuity of leadership from the design phase through occupancy. The construction management firm makes significant inputs to the architect relating to cost, quality of materials and time. In this manner the architect can then adjust the bid package to take advantage of the market. The actual bidding of the project is left in the hands of the construction management firm. If cost overruns become apparent, the bidding specifications may be adjusted to stay within the budget. In some cases, the quality of materials may be lowered. The duties of the construction management firm end with the occupancy of the building. The adjustments and guarantees made by the construction management firm become the responsibility of the board of education at the time of occupancy. Such conditions can add significantly to the total cost of the facility.

Construction management contracts vary and should be reviewed by legal counsel before the contract is signed. This type of contractual relationship is used widely in the private sector where there are few governmental restrictions regarding this relationship. The same is not true for public school districts. Before a school district contemplates this type of contractual relationship, either state or local legal counsel should be consulted to determine its legality.

Design/Build. Another contractual arrangement that school districts have begun to use in completing capital projects is called design/build.[31] Under this arrangement one firm does the design work and the construction work. An advantage of this arrangement is that the school district has only one firm or team to deal with

through the design and construction phase, as opposed to the usual two or more under the conventional contractual method. Figure 23:5 shows this contractual relationship.

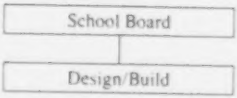

Figure 23:5 Design/Build Relationship

The design/build contractual method is defined as a situation where a group of professionals such as architects, engineers and others join the builder in the formation of a team that will provide to a school district all of the services from design to construction. Each team interested in a proposed capital project is invited to submit a cost bid to design and construct a building based on the educational program and criteria promulgated by the school district. Each team then submits to the board of education a preliminary design and construction cost estimate to complete the project. The board of education then selects one team for the contract based on both design and costs.

At initial consideration this contractual method may seem to offer school districts several advantages, but caution must be exercised before such an arrangement is completed. Pursuant to state statutes, there may be a question regarding the legality of such a procurement method.[12] Some school districts are required by law to award a construction contract to the lowest responsible and responsive bidder following a period of competitive bidding. Such a provision may preclude a school district's entering into this type of contractual relationship. Some school districts have the ability to secure such services through a process called competitive negotiations. Competitive negotiation allows a school district to choose a design/build team based on successive competitive negotiations with several qualified firms. Obtaining the services of a design/build team may well fall into that category of service procurement; however, the school district should obtain an opinion from the Office of the Attorney General regarding the legality of the contract before entering into such an agreement.

Design/build requires a great deal of expertise on the part of the school district staff to properly evaluate the design and cost proposals. Almost all of the school districts throughout the country lack this type of expertise to complete the evaluation, let alone the monitoring of the project through the design/build stage. Unless the school district already has the necessary skilled personnel on the staff or is prepared to augment the staff with outside expertise, the school district is probably well advised not to attempt to enter into such types of arrangements.[13]

Construction Supervision

When a capital project of any scale is under construction, the school board needs to have the project proceed in an orderly and timely fashion with the assurance that all contractual documents and building specifications are met. The periodic supervision and interpretation of the contract documents, usually furnished

by the architect, does not ordinarily provide the daily inspection of construction that fully protects the owner's interest. A *clerk-of-the-works* or owner's supervisor, well qualified to inspect the work in progress, should be selected prior to signing the construction contract, and the status of this position should be defined in the general or special conditions of the contract."

Continuous inspection is the only way to observe the quality of work in a construction project and assist in correction of inevitable problems. Without such inspection, no one can verify that the contract documents are being fulfilled.

Under the standard AIA contract, the architect is not responsible for exhaustive continuous inspection unless provided by agreement in the contract." The amount of the fee allocated to construction administration is not sufficient to provide this service. Therefore, the board of education is required to pay the salary of a full-time, on-site owner representative. On small projects, some member of the maintenance staff may act in this capacity.

The primary function of the clerk-of-the-works is to understand the contract documents, be aware of the construction schedule, observe the work in progress and ensure that the architect's representative is on the premises at the proper time and that necessary inspections are conducted. This person should maintain records of working documents and specifications, correspondence, conferences, original contract documents, addenda, change orders, supplementary drawings and keep a log book recording all daily activities including weather and personnel on the job. Any discrepancies observed in work performed should immediately be reported to the architect and entered in the log. It is important that the owner's representative understand the limitations of the authority of this position and that this supervision is only a supplement to the work of the architect's employees. The clerk-of-the-works is not authorized to make any decisions concerning the design or construction of the building.

Planning for Occupancy

A great deal of work goes into the planning, designing and construction of a school facility by various groups and individuals, and yet it is the staff of the school organization that makes the building really work. Therefore, it is imperative that the teachers and classified staff of a new or remodeled building be oriented to how it operates." Not only does an orientation serve to introduce the staff to the physical features of the building, it brings a closure to the teacher and staff involvement in the planning process. Ideally, teachers and administrators are involved in helping to formulate the scope of program that will be carried on in the new or remodeled facility. In fact, some of those who were involved in the initial planning may be assigned to the new facility. Thus, some individuals who may have been involved in the first part of the planning process are then involved in the orientation program for moving into the actual facility. People who are expected to work in a new facility should know how it operates (where certain facilities are, how the new technology functions, how the structure is expected to respond to the educational program and what the health and safety features are).

The educational planner who took the lead in the school planning effort should also exert leadership in orienting the staff. Others involved in the planning and

execution of the orientation program should be the principal of the school, the educational consultant and the architect. Inasmuch as the orientation needs of the teaching staff differ from that of the classified staff, the orientation effort should have several focuses. The Council of Educational Facility Planners International suggest that orientation programs should consist of, a user orientation program and a public information program." The former is devoted to helping those individuals who will work within the facility become familiar with how it operates. The latter is designed to promote the idea of the school building as a community resource.

Staff Orientation

Orientation programs for teachers may take a variety of forms designed to enable them to understand the functioning of the building and how it supports the educational program. These activities may include: building tours, in-service sessions with fellow educators, mock fire drills, discussions centering on floor plans and question-answer sessions with the architect. Orientation sessions for the classified staff may take a similar form, but the content will be directed more to how these service providers perform their job functions within the new facility.

It is very important that the custodial staff and individuals responsible for the HVAC system thoroughly understand the workings of the system. Many times the firm that supplied the HVAC system will conduct orientation sessions with the staff and in some cases the firms have been known to take the building engineer to the factory for an intense orientation in the operation and maintenance of the system.

Public Information Programs

Public information programs are designed to let the community know what they bought, how they too can use the facility and encourage them to use it. Whatever the format, this program should serve to bring closure to the minds of the community with respect to the planning/constructing process. The activities which can be considered include: a building dedication, an open house, student orientation, building tours for the community, media publicity and various printed materials.

Post-Occupancy Evaluation

Following the successful occupation and orientation of the completed facility, a post-occupancy evaluation by educators is highly recommended. There is a temptation to neglect this activity because usually the facility is working well, many individuals perceive the project to be completed and there may not be very much thought about what contribution such an evaluation could make to the next capital project. The data obtained at this time can be critical to future capital planning efforts. If it is not collected in a timely and organized fashion, it may never become available.

There are two things that need to be evaluated at this time—the product and the process. The product of the school planning effort is the building itself, and the process is all the activities of the many persons and groups involved in planning and constructing the facility. Both product and process are legitimate subjects of evaluation.

Process Evaluation

Immediately following the occupancy of the facility, the process used in planning the facility should be evaluated while it is still fresh in the minds of the individuals who participated. Effective evaluation helps to correct problems and ensure a better process and involvement in the next capital project. People and agencies involved in the process should be surveyed to determine their perception of the success of the process and how they feel it should be improved in the future.

There is no standard form or method of obtaining data regarding involvement. The educational planner can prepare an instrument tailored to the area and reflect the planning process used in the school district. A questionnaire can be completed by the participant, or interviews can be used to collect data, if there is sufficient resources. Data desired deals with what people feel their contribution was to the project, how other groups and individuals contributed and whether the process was conducive to good planning as they understand it.

Product Evaluation

Evaluation of the building itself involves determination of how it operates, how it supports the educational program, how much it costs to operate the facility and whether the school district got what it wanted. The evaluation's form can vary according to the data desired. There should, however, an attempt to collect more than just the quantifiable data associated with square foot ratios, costs per square foot, cost per pupil, square feet per pupil, life-cycle comparisons, construction time, number and amount of change orders. The evaluation should also gather data to assess such things as architectural and educational innovations and the impact of various design features on the educational program and student movement.

The board of education will need to develop and finalize the evaluative system, develop proper instruments to gather data, identify persons to gather data and identify persons or agencies to receive the evaluative data. Of course, the purpose of the evaluation must be identified and approved as the first step because only from those goals or purposes can the needed data be determined and its use be established. The board of education also needs to determine how often and when future evaluations will occur.

Maintenance and Operations

Operations Procedures

Regardless how well conceived and constructed the facility might be, unless it is kept clean and in good working order, the facility will not effectively support the educational program. A clean and functioning school building is extremely important to the success of the educational program. All of the successes in planning and designing a school facility are overshadowed by poor housekeeping.

The maintenance and operations staff of an entire school district is usually headed by one individual. Depending on the size and complexity of the particular school district, the person who heads up this staff might be either an executive director, director or supervisor of maintenance and operations reporting to an as-

sistant superintendent for operations or support services. In small school districts, the school business administrator may have responsibility for supervising this department along with others. Regardless of the organizational structure, the purpose of maintenance and operations services is the same—keeping the facilities clean and in good repair. The operations staff of the school district seeks to keep the facilities as clean as possible. Efforts of maintenance staff, on the other hand, are directed at keeping the building functioning. These services can include routine and emergency repairs, scheduled preventive maintenance, painting and other work that will enable the teaching staff to have an environment that is healthy and in working order.[9]

While most school building administrators do not directly manage the building's custodial program, they are ultimately responsible for the cleanliness and well being of the facility they administer. The building administrator must make certain that the building is clean and in good working order; however, the administrator may not be knowledgeable about the technical details of how the custodial staff should do the work to clean the building.

Roles and Responsibilities. The line of authority and responsibility for the custodial staff of an individual school building is usually shared between the principal and the school business administrator of the school district.[10] The dual nature of authority/responsibility of the custodian lies in the fact that he or she is hired and trained by one office of the district to do a service for the staff of an individual school building that has a principal who is responsible for all activities within the physical structure. The principal of a school is normally in charge of all programs and personnel within the building, or, as is commonly stated, the principal is responsible for "everyone under the roof of the school." Because of this authority, all personnel who work in that building are under the direct supervision of the principal. Thus, the principal supervises the work of the custodial staff to the extent that all custodial work must be acceptable to the principal. At the same time, the custodian is directly responsible to the school business administrator's staff. The custodian is in direct line of authority from the supervisor or director of custodial services. This relationship is illustrated in Figure 23:6.

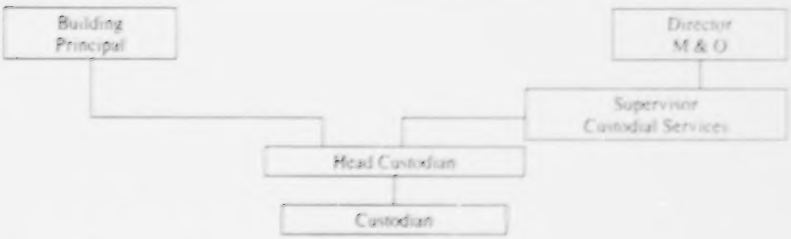

Figure 23:6 Principal-Custodian Relationship

Custodians are responsible to the local school building principal for the following:

- Ensuring cleanliness of all aspects of the building and grounds.
- Maintaining the proper environment which includes temperature control, ventilation, building safety and healthful conditions.
- Scheduling all custodial activities so as not to interfere with educational and related activities and making the school and its facilities available as the principal directs.
- Cooperating with the staff to achieve the purposes of the school.[40]

It is important that a good cooperative working relationship exist between the custodial and instructional staffs for the successful operation of the school organization. This relationship must be characterized by each staff respecting and supporting the work and responsibility of the other, and recognizing that both staffs are working toward the same goal—effective education of students. Custodians and members of the cleaning staff are employed by the school district and are assigned to various locations. They are trained by a central administrative officer or staff in a prescribed method of cleaning and operating the school building, and their technical expertise is supervised by this staff. Therefore, the local school building custodial staff members are responsible to the central staff for the following activities:

- Carrying out established system-wide procedures and standards of performance.
- Operating equipment and machinery of the capital plant of the school.
- Taking the necessary steps to protect the building and equipment of the school system in case of emergency.[41]

Qualifications. The key to clean and good working facilities is to have high caliber, efficient custodial staff who perform quality work. Just as teachers and administrators should possess qualifications for their respective positions, the custodian must meet certain qualifications. These qualifications might include:

- Good health and energy with no physical defects.
- A high school diploma and be able to read and write sufficiently well to understand written and oral orders.
- A neat appearance.
- Dependable and orderly work habits.
- Ability to get along well with people and have respect for children.
- A willingness to learn.
- A degree of maturity to be able to work around children (with a minimum age requirement of 21 years old).
- A good character.[42]

The above list of qualities are minimal requirements. The school custodian's position is a demanding one and should be occupied by a person of the highest possible qualifications. By demanding more of applicants, the school district will in effect obtain better employees.

Although a person meeting the above qualifications might command a salary higher than what a school district may be able to pay, there are other benefits that a school district can offer prospective employees which more than compensate for the differences in salary. The retirement system of most school districts is much better and more reliable than what is available in industry for the time spent in the job. Additionally, the other employee benefits are at least equal to what the private sector offers. A very intangible benefit, but one that perhaps far outweighs the rest, is the pleasant surroundings in which the custodian works and the prospect of building good working relationships with a variety of employees over a period of years.

Training and Orientation. Once a person has been employed by the school district to perform custodial duties, sufficient training and orientation should take place so that the person can perform efficiently. No matter how well qualified a person might be, that individual needs to be trained in the methods and procedures of the particular school district. This training is usually conducted on a district-wide basis by central administration staff.

The type of training offered new custodial workers varies from school district to school district. Such training may be as simple as a few verbal instructions to a more elaborate pre-service training program of several days conducted by larger school districts. In some instances, state departments of education have conducted custodial training in areas of the state that might benefit from such services. Because of the indigenous nature of the custodial work, the most effective programs are those that are directed to the needs of the local school district. Regardless of the size of the organization, however, the new custodial worker needs to learn the methods of cleaning preferred by the school district, the schedule of work at a particular station, the responsibilities that will be expected of the worker and the level or quality of work that will be expected. Such minimal pre-service training should at least enable the worker to begin work immediately and effectively. Custodial workers should never be allowed to learn on their own or to find out how to do the job themselves. To let his happen invites unmet performance standards and a sense of failure on the part of the employee.

If a school district does not currently have a pre-service training program for new custodial workers, one needs to be established. Several avenues of assistance are open to a system that desires to establish such a program. Commercial concerns that manufacture custodial products are a good source of assistance in training to use their products. Neighboring school districts, especially larger ones, are an excellent source of assistance. In some instances, the person responsible for training custodial workers in a large school district is permitted by the superintendent to conduct pre- and in-service activities in neighboring school districts, thereby establishing a uniform training program for the region.

Pre-service training is never enough to ensure competency over a long period of time. The school district should plan for a systematic in-service training program for all custodial workers employed. New methods and products for cleaning should be introduced at these sessions that should be mandatory for all staff members. These in-service training sessions should not only be limited to cleaning methods and products, but also cover a variety of topics and concerns designed to help the custodial worker become an effective member of the organization. The results of

such training will improve service and overall building operations, and as well as boost the morale of the entire school staff.

Oversight and Evaluation. In large school buildings where there are several custodial workers, one person is normally named as the head custodian. This person usually organizes the work force and schedules the activities. The head custodian makes certain that all the tasks necessary for a clean school are discharged in accordance with the staff available and that all of the activities that take place in the building are covered where necessary according to school district policy. Although each school district organizes the custodial program around the needs of the particular organization and available resources, local custom and union agreements often are controlling factors in specific work agreements.

The building principal should periodically review the work schedule of the custodian(s) who are assigned to the building to make certain that all tasks are covered and assignments are made to ensure a clean facility. If changes are needed in the schedule to improve the routine, the principal should confer with the director or supervisor of custodial services for the school district so that the latter can take appropriate action to improve the service.

The evaluation of custodial workers is usually done by the head custodian and by the director or supervisor of custodial services. The principal of the building to which the custodian is assigned has an input into the evaluation process, but the final evaluation is completed by those persons who hired and trained the custodial worker. Evaluation of custodial staff is usually on an informal basis, but in some larger school districts, formal evaluative procedures and forms are used in a systematic evaluation program.

The Maintenance Function

Every school organization has some system for completing repairs and minor improvements to school building. Such activities are usually the responsibility of the central maintenance staff. This staff provides necessary services to the local building principal beyond the normal scope of work of custodians. These services include: routine and emergency repairs, scheduled preventive maintenance, major and minor renovations, and up-dating of facilities for teaching needs such as installation of chalkboards, shelving, new lighting and plumbing.[41]

The maintenance program is administered from the central administration office under the supervision of a person usually titled director or supervisor of maintenance. This person is augmented by an office to handle maintenance requests and a staff of trained persons representing various crafts and trades. The size of the staff and the number of crafts and trades represented vary greatly from one school district to another. Obviously, the larger the school district, the larger and more diversified is the maintenance crew. Small school districts on the other hand, usually have limited maintenance staffs and contract outside of the school district for difficult repair jobs. Many school districts find it more economical to contract larger maintenance tasks to outside agencies and employ a small maintenance crew to perform smaller services. Each school district, however, determines the best process and staffing configuration to take care of both large and small maintenance needs.

Requests for repair work or building improvements are channelled through the principal's office and forwarded to the central maintenance department. Each

school district has forms to be used for requesting such service. These requests are prioritized, screened for budget resources and assigned to a crew for completion. Each crew documents to the central maintenance department that the work has been completed. Through a feed-back system, the principal of the building is notified of the disposition of the particular item requested.

In addition to requests from principals, the maintenance department initiates requests following inspection of the facilities. Such requests typically focus on technical details which an educator might overlook, such as the condition of the boiler or the roof. These inspections are usually conducted on an annual basis, although some school districts conduct inspections more frequently. Occasionally, special inspections for internal maintenance items are conducted at certain times of the year. Additionally, the daily inspection of the building by the school custodian should also serve to identify needed repairs and building improvements.

The maintenance items identified through such inspections fall into two categories—small items that the school district personnel can complete and large items for which the school district does not have the in-house expertise. Examples of the latter category include boiler replacement, new roof installation, removal of an interior wall or up-grading rest rooms. These items are then included in the CIP of the school district, funded under the capital budget, prioritized according to local needs, and completed through outside contracting.

Preventive Maintenance Programs. The preventive maintenance program is a regularly scheduled plan to extend the life of each piece of major mechanical equipment and to preserve the physical properties and function of the building itself.[44] Under this type of program custodians and maintenance personnel inspect and service all mechanical equipment on a regularly scheduled basis to prevent any cause of shut-down. Likewise, periodic inspections are made of the building structure to determine wear or faults that need to be corrected at their initial stage. A preventive maintenance program is developed by the central administration staff for every facility in the school district in conjunction with architects and engineers. Naturally, the best time to develop such a program is during the design and construction stage of a new facility. Undoubtedly, most school districts need outside assistance to develop such a program which would encompass all buildings, but the savings in cost of future repairs and shut-downs more than compensate for the cost of developing such programs.

Energy Management Monitoring Systems

Some school districts have developed energy management monitoring systems that use a computer to centrally obtain data on various aspects of building environments to control costs of energy. Such systems monitor the building temperature, outside air, intake air temperature, output of the heating plant, speed of fans and other similar components in order to provide a central office with a composite look at energy consumption at any particular facility.[45] By centrally monitoring the HVAC system, appropriate measures of control can be exercised for a system disfunction. In some instances, corrections can be made to the local building heating and cooling system by the central computer, eliminating the need to send a maintenance crew to the building. Of course, such corrections are limited to adjustments to those components under surveillance, but the computer can immediately call

attention to any condition that cannot be corrected through computer intervention and that needs personnel to go to the scene to repair or correct a piece of equipment or building feature. As the availability of such technology increases and the cost is reduced, even small school organizations will utilize such systems to control energy use and subsequent cost.

Role of Maintenance and Operating Staff in Energy Conservation

An analysis of the services of the custodians and maintenance personnel indicates that the primary function of custodians is cleaning and that of maintenance personnel is repairing and maintaining. The duties of custodians may overlap with maintenance personnel as the first line of defense in energy conservation and in preventive maintenance. Custodians thus may make observations about the wear, adjustment and regulatory levels of equipment, make minor adjustments and report needs for further services required of more skilled personnel. Regardless of the division of work between the custodial and maintenance staffs, the efforts of both groups as related to energy conservation practices involve four functions: observing, cleaning, repairing and measuring.[46]

Custodial personnel should be trained to constantly observe the working of the facility. The custodian should observe such things as the operation of thermostats, water faucets, toilets and closing mechanisms. The custodian serves as the eyes and ears for the principal and maintenance staff for the safe and efficient operation of the building. From this observation, the custodian can determine whether the condition can be remedied by the school custodial staff or whether the maintenance crew must be notified. In order to conserve energy, it is important that the custodian be trained to observe conditions of the building that would needlessly use energy. In the daily rounds of cleaning the building, the custodian should observe and check each functioning part of the environment to make certain that it works. Custodians should recognize that by keeping the building, lighting system, equipment and filtration system clean they are helping to conserve energy.

While custodians should have some knowledge and skill concerning minor repairs such as thermostats, door controls, lighting fixtures, plumbing fixtures and flushing mechanisms, the custodian should not be responsible for repairs which normally fall under the responsibility of the maintenance crew. Consequently the custodian must be able to distinguish between those things that fall under his or her responsibility and the duties of the maintenance crew. Regardless of the policy and division of labor, a custodian should be capable of making those repairs that will help the building to continue to function efficiently and not waste energy.

Normally custodians do not assume responsibility for measuring such things as the consumption of energy, but in the present environment, custodians should be trained to take measurements in order to provide a data base for energy-use decisions.

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